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VIEWS, NEWS AND INTERVIEWS.

"So you want to hear about another of my experiences?" remarked Meekin, the lazy inventor, to one of Mr. Edison's assistants and an ELECTRICAL REVIEW reporter. "Did I ever tell you about the time that Jack Sanders and I worked the spiritualist racket through Indiana? No? Well, it was funny, but there was some work to it—you know I don't like work. But the fun made up for it. Why, I used to walk a mile out of town just to sit on a fence and laugh at the jays who came to see our show at the hotel. We had to be very solemn around the citizens, and so I had to get out of town somewhere when I wanted to laugh. The game was this: We sent a man about two weeks ahead of us who made the acquaintance of all the leading citizens of the town, including the photographers. Our man found out the names of people who believed in spiritualism and the names of their relatives who had died. Then the great and only spirit photographer (that was me) came along and gave out that he would make the portrait of any departed spirit called for by the audience at one dollar per spirit. We charged 'em a dollar apiece besides to get into the *séance*. An old lady would rise and say she wanted a photograph of herself and her son William, who had died 18 years ago. I would pose her in front of the camera, and while doing so quietly pumped her until I had obtained a general idea of William's appearance. Then I quietly telegraphed a signal to a man concealed in the dark room. I had a push button on the camera; the wires ran down inside the stand to a hole in the carpet, and then between the carpet and the floor to the dark room, where a little buzzer was located. We had a stock of negatives of typical faces. If I touched the button three times (like this: — — —) that meant I wanted the negative of a young man with light hair and smooth face. The man in concealment would find a negative approximating this description. He'd lay it where I could get it quickly and then crawl in his hole again. After I had secured a picture of the old lady I would rush into the dark room, take out the plate, grab the stock negative and uncover a little hole in the curtain over the window, letting in a single ray of light. Then I held the stock negative over the undeveloped plate and let the light act on it for a second. I then shut the hole, concealed the stock negative, put the undeveloped plate back in the holder (all of which was done in a very few seconds) and rushed back into the audience room for the investigating committee of village photographers, asking what had become of them, why they hadn't followed me into the dark room, and so on. Then the committee returned to the dark room with me, the plate was developed and we had a fairly good portrait of the old lady with a hazy face at her shoulder that might have been a portrait of anybody. But she never failed to recognize William or whoever it was she had called for. Of course, we had to vary the programme, but the method of picturing the spirits was always the same. Well, we covered most of the large towns in Indiana and were simply shoveling in the money when we thought we saw that the crowds were growing suspicious. I suggested then that we travel back over our route and expose the show. We did so and got a dollar apiece more from the spiritualists and others. We got along all right until we struck Muncie, where the show ended in a riot and I had to slide out the back door with the money box."

"I have observed the workings of a great many electric light companies," said an old-timer, "and I believe that one reason why some of them do not pay good dividends is because the men interested are regularly engaged in some other business and regard their electric light investment as a side issue able to care for itself. Then, too, one unbusinesslike or over-conservative man on a board of directors may prove to be a veritable mill-stone around the neck of the company. I recall a case of this kind which occurred in a Connecticut town. A director in the company was a man engaged in a small way in another calling. He had saved some money by great self-denials and invested it in stock of the new electric light company in his town. He had absolutely no business capacity, and his friends all wondered how he prospered as he did. The company needed more money and had arranged to borrow it from the late P. T. Barnum. During a discussion of the matter this director said: 'Don't you suppose we could get Mr. Barnum to credit the interest on this loan to the principal, and when we pay interest equaling the amount of the principal he would give us back our notes? It would take about 16 years to do this.' He was serious about it, too. Business methods have to be followed by electric lighting companies as well as all other kinds of companies, if dividends are to be paid."

FIG. 1.—AMERICAN BELL TELEPHONE COMPANY'S MARINE TELEPHONE SET NO. 2.

THE AMERICAN BELL TELEPHONE COMPANY'S MARINE TELEPHONE SETS.

CORRECTLY CONSTRUCTED INSTRUMENTS FOR NAVAL SERVICE.

One of the most important functions aboard ship, especially on a man-of-war, is the rapid communication of signals and orders. Very often this is of vital importance as in cases where accidents occur and demand prompt action. Telegraphic signal systems are useful, but not always positive, up to a certain limit. Speaking tubes also have a limited value, but they are cumbrous, and this alone constitutes a fatal fault to the naval man. The telephone, by which the spoken order is directly and personally transmitted from one source of authority to another, has proved to be by far the most satisfactory means of communication for vessels. There are conditions on shipboard which require peculiar and special construction of the instruments, among these being imperviousness to moisture, durability, resistance to corrosion and compactness. With these conditions fulfilled and a properly constructed system of wiring, a man-of-war can be as thoroughly equipped for the rapid transmission of orders and signals as is a modern office building or a well-appointed factory.

The American Bell Telephone Company is naturally looked upon as the fountain head of improvements in the telephone and as the one company above all others to appreciate its many possibilities of adaptation. That they have sustained their reputation in this respect is well shown in their complete line of marine telephone sets, several of which are here illustrated. The company furnishes four sets of instruments for use on board ships. They are designated as "marine sets" Numbers 1, 2, 3 and 4.

Marine set No. 1 is designed for use between decks, and consists of a transmitter of the solid back type, a receiver similar to that used on speaking tubes sets, together with a bell

and push button for calling. The whole set is contained in a box which is mounted on a back board 11x6 inches. With mouth-piece the space required is 11x6x4⅞ inches. The cover of the box is held on by eight screws. The exposed brass surfaces in this set are finished a dark blue color.

Marine set No. 2 is intended for use in exposed places, and is placed upon a standard capable of revolution or vertical adjustment. When depressed, the transmitter stands 50 inches high. The standard is made of brass, polished, having a diameter of 12 inches at the base, and is arranged to be bolted to the deck of the vessel. It is to contain no calling apparatus, and consists simply of a transmitter of the solid back type and a receiver. The set is so arranged that the receiver is held between three springs set on the sides in the mouth-piece of the transmitter, and when the receiver is in position its weight causes the transmitter to revolve until inverted, and in this way the transmitter is protected from the weather.

Marine set No. 3 is designed for use in exposed places, such as a military top, and can be secured to any vertical support. It is similar to set No. 2 in the arrangement of transmitter and receiver, but it contains a push button and bell for calling. The space occupied by the set is 17x10⅜x6⅞ inches. The frame is of polished brass, the front of the box being of hard wood, finished. The transmitter and receiver are made of brass.

Marine set No. 4 is made for use in unexposed places, and is similar to set No. 1, except that it contains no calling apparatus. It consists of a transmitter of the solid back type, receiver with brass case and automatic switch, with hook for hanging the receiver. The transmitter is mounted on a wooden box placed on a backboard 5⅜x6⅛ inches. The total space occupied by the set is 4¼x5⅜x6⅛ inches. The exposed brass surfaces are finished a dark blue color.

Finances of the General Electric Company.

The *Boston News Bureau* says that the receipts of the General Electric Company are still overbalancing payments and the company has now nearly $600,000 in cash on hand, besides $250,000 cash on deposit, to pay the next semi-annual bond interest. It has also in its treasury $1,000,000 of its bonds which it has purchased at a cost of about $870,000. The company has no notes outstanding save one of $2,126, which it has been unable to get in, and two old guarantees aggregating $130,279, which guarantees it may never be called upon to make good.

The Telegrapher's Fate.

Wiggs: Poor Rusher! He received many a telegram while he was alive.

Woggs: What of it?

Wiggs: Nothing, only they wired his skeleton up at the medical college this morning.—*Buffalo Courier.*

ELECTRIC RAILWAY NOTES.

Bridgeport, Conn., is talking of taxing trolley cars $10 each per annum.

All overhead wires, including railway feeders, on Union Boulevard, St. Louis, will probably be put underground.

Staten Island, N. Y., from all appearances, is to be gridironed with electric roads. Several new roads are in contemplation.

The Fairhaven, Mass., selectmen have refused to let the Union Street Railway Company run its cars in that town by electricity.

The Brooklyn, N. Y., Board of Aldermen will endorse a resolution requiring all trolley cars in that city to be equipped with safety fenders.

The consolidation of the North Highlands Electric Railroad Company and the Columbus, Ga., Street Railroad Company has been effected.

There is to be a new electric railway between Galion and Bucyrus, Ohio. Work will begin May 1, 1895, and will be completed by September 1, 1895.

The property of the Northeast Railway Company, of Kansas City, Mo., known as the Northeast Electric line, is to be sold to pay bonds issued in 1889.

The "Meadow line" is the name of a proposed electric railway across the intervale on the Connecticut river between Northampton and Easthampton, Mass.

It was reported in Philadelphia last week that overtures had been made by the Electric Traction Company for the lease of the Hestonville line. Both companies deny the report.

Machinery calculated to double the capacity of the Alton, Ill., Electric Street Railway Company's big plant has been ordered and will be placed by the middle of December.

The annual report of State Engineer Adams will contain a recommendation that electric power be used as a method of propulsion for canal boats on the New York State canals.

The Fort Worth, Tex., Street Railway Company has purchased the North Side Company's property for $30,000. The new company will put $50,000 in improvement on the track, cars, etc.

There is some talk of an electric street railway to run through Faribault, Minn., and out to Cannon and Roberts' lakes, two beautiful Summer resorts, three and four miles from the city.

The Board of Trustees of Mechanicsville, N. Y., have granted a franchise for the construction of an electric road between Mechanicsville and Stillwater to the Powers Brothers, of Lansingburg.

The Canton-Massillon, Ohio, Electric Railway Company announces a horizontal reduction in wages of six and one-quarter per cent, to take effect on December 1. The employés will accept.

The Nassau Electric Railroad Company, of Brooklyn, N. Y., will use electric power from Fulton street to Atlantic avenue, the State Board of Railroad Commissioners having granted the company's application.

General Superintendent Power, of the Indiana Electric Railway, has signed a contract with the Home Electric Power Company, of Goshen, Ind., for power to operate their cars for a period of three years.

J. H. Roberts, of Grand Rapids, Mich., will, it is said, spend $100,000 in putting an electric railway around Mackinac Island. He has just secured franchises. The railway line will be eight miles long, and a three-minute service will be given during the Summer.

The motormen and other employés of the trolley companies in Brooklyn, N. Y., have renewed the movement for an increase in wages, and it has practically been decided that when the time comes for signing the contracts early next year a demand for an additional 25 cents a day will be made.

The following directors of the Buffalo, N. Y., Railway Company have been elected: H. Sellers McKee, T. De Witt Cuyler, Horace Magee, C. C. Cuyler, Henry M. Watson, S. S. Spaulding, H. H. Littell, Robert L. Fryer, George Urban, Jr., Daniel O'Day, John L. Williams, John N. Scatcherd, James B. Speed.

In the opinion of the ELECTRICAL REVIEW the two street railways in this country having the best lighted cars are the Broadway Cable Road and the Third Avenue Cable Road in New York city, using the Pintsch gas system. The same system has been adopted by the Columbus, Ohio, Railway Company, and many other roads will doubtless follow suit.

At Pottsville, Pa., on November 26, Judge Weidman handed down two lengthy opinions in reference to the rights of way of the Inter-County and the Tamaqua and Lansford electric railways, rival companies who secured rights of way to run lines from Tamaqua to Lansford through alleged frauds. The companies are enjoined from commencing work on the routes laid out.

The Shamokin, Pa., Electric Railway is about to suspend operations, because the hard times do not warrant its running. The traffic lately has not been sufficient to pay expenses, and when the question of stopping was brought before the Board of Directors it was practically decided to do so. But it is possible that if the times brighten up the road may start again.

Robert Fleming, the English capitalist, who is the chief financial backer of the Kansas City, Mo., Cable Railway, has recently purchased a large interest in the West Side Electric Railroad in Kansas City, Kan. W. N. Coler, a New York banker and capitalist, is buying stock in the Kansas City Cable Railway. This places the two roads under one control, and it is said to be only a matter of a short time until the roads will be under the same management, with the same president and the same directors.

A jury in the City Court in Brooklyn, N. Y., a few months ago, gave judgment for $22,500 in favor of Annie Tholen, the eight-year-old daughter of John S. Tholen, in her suit against the Brooklyn City Railroad Company. The girl had lost both her legs by being run over by a Third avenue trolley car. The father also recovered $3,000 from the company for the loss of his daughter's services. The company appealed in each case. Last week the General Term handed down a decision sustaining both verdicts. The court censured the motorman.

Application was made to the Islip, L. I., town board last week, by a syndicate composed of the Austral Hotel Company and a New York construction company, for a franchise to run a trolley line from Brentwood southward to Bay Shore and thence to the westerly boundary line of the town. If the franchise is granted a similar application will be made to the Babylon officials. The road will be less than 10 miles in length, but will be the means of connecting the middle section of the island with the south shore. It is thought that the road may be the means of making Brentwood a Winter resort. The company will be incorporated with a capital stock of $100,000. They expect to complete the road before December 1, 1896. The town board has practically agreed to grant the franchise at its next meeting, and work on the road will begin in January.

The Seelys, The Bakers and The Bennetts.

The New York *Evening Sun* in a recent issue published the following:

A push-cart belonging to a subway concern halted directly in front of the entrance to Police Headquarters this morning. Carts of that kind stand there every day, but never one like that. There was an immediate rush for it as soon as some one read the lettering on it and passed the word around. This was it:

The Complete Electric Construction Company, 121 Liberty street; J. A. Seely, President; C. O. Baker, Jr., Treasurer.

It was a coincidence, of course; that was all. But the names of Seely and Baker standing together just at this time, and in that place, of all places, was too much for the police wags. The word went around that the fugitive bank bookkeeper's belongings had been seized; that Seely's "trunk" was at the door.

The reference is to Bookkeeper Seely of the Shoe and Leather Bank, who, with his accomplice Baker, got away with $354,000. The coincidence is carried further by the fact that Bennett is the name of Bookkeeper Seely's brother-in-law, who was employed in the bank, and is also the name of the auditor of the Complete Electric Construction Company. The electrical men mentioned have already achieved several kinds of fame, but none of such a startling character as did their namesakes in the bank affair.

TELEPHONE NEWS AND COMMENT.

A telephone line is being built from Mapleton to Ashland, Me.

The Winona Telephone Company has completed its line from Plum City to Ono, Wis.

The work of building subways for the telephone wires has been begun at Pawtucket, R. I.

The Southern New England Telephone Company has begun the work of putting its wires underground at Middletown, Conn.

A telephone line has just been completed connecting Little Falls and Pierz, Minn., a distance of 15 miles. H. P. Berg, a Pierz merchant, is the owner of the line.

The Central Union Telephone Company gave notice recently that they would not allow the Harrison company to erect their instruments at Findlay, O. An argument may be expected.

The Southern New England Telephone Company will replace the 104 pound per mile wire now in use on all trunk lines by a 172 pound wire having a breaking stress of 533 pounds, as against 342.

A new telephone exchange has been established in Faribault, Minn., and will soon be in operation. It is reported that it will cut the rate to $1.50 per month, less than one-half of the rate of the old company.

A number of journalists of Berlin and Vienna on November 29 made a trial of the telephone between the two cities, and a conversation was successfully maintained. The line was opened for public use on December 1.

The Shamokin Valley, Pa., Telephone Company, with a capital stock of $25,000, has been organized and active steps will be taken to put the line, which will extend from Mt. Carmel to Sunbury, into operation as soon as a charter can be procured.

The Southern New England Telephone Company has made a reduction in rates at automatic stations which went into effect December 1. The local charge from one town in a division to another in the same division will be 10 cents instead of 15, as heretofore.

At a recent meeting of the Leavenworth, Kas., City Council, Mayor Dodsworth vetoed the ordinance recently passed, granting a franchise to the People's Telephone Company. A more comprehensive ordinance, granting greater benefits to the city is demanded, which may go through at another meeting of the council.

The Rahway, N. J., Mutual Telephone Company, which has just been organized, proposes to furnish telephones to private residences for $20 a year, and to stores, factories and offices for $30 a year. The incorporators are ex-Mayor Chamberlain, County Clerk Howard, Dr. H. Page Hough, Charles Oliver, H. P. Rollinson, F. A. Thompson, W. J. Lindsley.

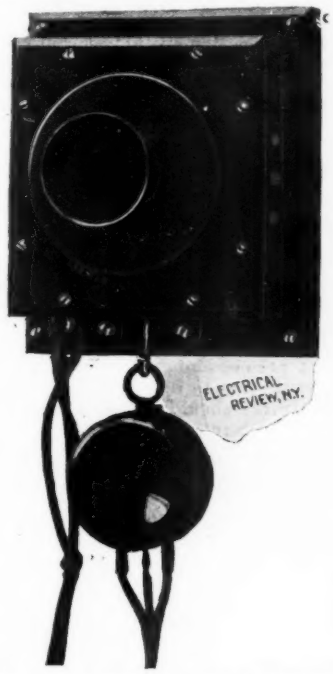

FIG. 2. — AMERICAN BELL TELEPHONE COMPANY'S MARINE TELEPHONE SET No. 4.—(See First page.)

The title of the new corporation asking telephone franchises in Pittsburgh, Pa., is the Pittsburgh Electric Company. It asks the right to erect poles and wires on all of the thoroughfares of the city, and to bury wires in those districts where that is required. Vice-president Henry Metzger, of the Central District and Printing Telegraph Company, says the new concern has no connection with his corporation.

The telephone cable connecting Natchez, Miss., and Vidalia, La., is now a certainty. The necessary bonus towards the enterprise has been secured, the requisite amount of cash deposited and the Great Southern Telephone and Telegraph Company duly notified. It is supposed the latter will at once complete negotiations for the cable and its laying, and that the work will be started without further delay.

The St. Louis, Mo., City Council recently received a bill providing for the formation of a new telephone company and for the erection of its wires, poles, construction of conduits and other apparatus. The promoters are J. A. J. Schultz, William J. Kurtz, Thomas J. Ward, I. Ricord Gradwell, Joseph M. O'Shea, Andrew J. Haley, Louis J. Oswald and T. J. Hennesey. The annual rates for the use of telephones is $60 for business houses and $48 for residences. The compensation offered to the city is the use of a number of telephones, not to exceed 40, free. The bill passed its first reading.

Justice Gaynor of the Supreme Court has granted a mandamus prohibiting the Brooklyn, N. Y., Subway Commission from interfering with the operations of the New York and Eastern Telegraph and Telephone Company, which recently received a franchise from the aldermen. The Subway Commission contended that the company was not incorporated in New Jersey under the telegraph act, but only under the general corporation act. Justice Gaynor held that the Subway Commission had no right to interfere when the company had been recognized as possessing a franchise by the proper municipal authorities.

More About the Vagaries of the Trolley Current.

TO THE EDITOR OF ELECTRICAL REVIEW:

In April of this year Mr. Isaiah H. Farnham read before the American Institute of Electrical Engineers a very interesting paper on the "Destructive Effect of Electrical Currents on Subterranean Metal Pipes," with some remarkably striking diagrams and photographs illustrating these destructive effects. These were proven to be caused by leaking current from grounded electrical circuits. Without entering into scientific formulas and arguments, it is sufficient for the present purpose to state briefly that any current which is permitted more than one route will traverse many roads, the proportion which follows any one path being inversely as its resistance or opposition to the passage of the electricity. Thus, three routes being

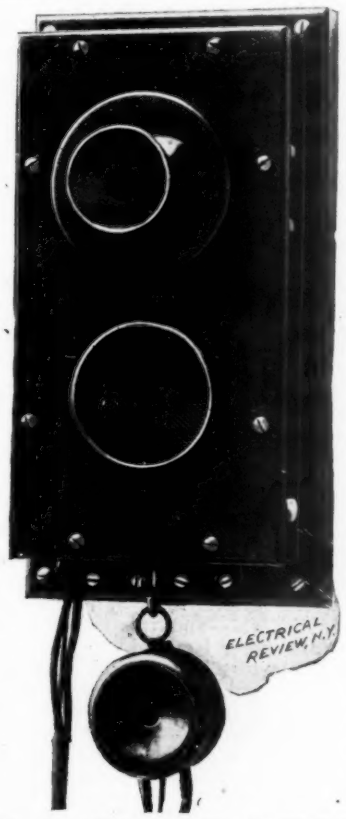

FIG. 3.—AMERICAN BELL TELEPHONE COMPANY'S MARINE TELEPHONE SET No. 1.—(See First page.)

open to the current, have one, two and three units of resistance, the current will divide into six portions, and the first route will carry three of these parts, the second two, and the third one, and this scheme of division will follow this law, irrespective of the number of paths.

The investigations and experiments which led up to the paper referred to have been going on since 1891, and show conclusively that despite the many suggestions which have been made for the correction of the trouble, are only partially successful in overcoming the destructive effect of the chemical action which results from the escape of very small amounts of current.

Another result seems liable to be entailed by these grounded circuits—that is, circuits in which the current is carried through one-half its course on metallic conductors and is permitted to return through the earth to "the place of beginning," as the real estate man would put it.

There are several systems of protection used on the steam railroads, known as block or signal systems, arranged so that an approaching train sets a signal by electrically connecting the two rails, and holds all other trains from entering the section of road so protected until the track is again clear.

These signals are operated by a minimum current, the amount being only what is generated by one or two ordinary cells, at a pressure of, say, a couple of units, or volts. This feeble force, one would readily see, can be easily overcome by an opposing current, and the amounts of current escaping, as illustrated by Mr. Farnham, are abundantly competent to this end.

Some recent measurements made by interested parties not farther away than Milwaukee have shown some interesting results, which have been collated for reference. These are measurements of differences of electrical potential or pressure measured from one rail to another across the tracks. The road, it is understood, has a double track, and there are consequently four rails, which for convenience we will number 1, 2, 3, 4.

The blocks are electrically separated from each other by insulation, so that the train controls only the block it is standing or moving on. A very small number taken from many measurements will serve to illustrate: Measurement No. 1. From rail 1 to rail 2, $\frac{2}{10}$ volts; to rail 3, 0 volts; to rail 4, 1½ volts; from rail 3 to rail 4, 1 volt. Between terminals of blocks at this point, $\frac{4}{10}$, $\frac{6}{10}$, $\frac{7}{10}$ volts. Sixty-four rails further on differences of $\frac{2}{10}$, $\frac{3}{10}$, 1, 3½, 4, volts are shown between rails, and between blocks a current of 3 amperes, and a difference of potential of 4 to 5 and 2 to 6 volts at the rails 1 and 2. At a point where the disturbing element is in quite close proximity to the rails there is a difference of potential of eight to 11 volts with two to four amperes of current, and close by there is a difference of two to nine volts.

Occasionally these differences of potential have been much exceeded, no less than 15 volts having occasionally been found between two rails. The question naturally arises, How can a track signal system be operated under such adverse circumstances? or, Must the steam railways succumb to the overhead, single or grounded trolley? C. C. HASKINS.

Chicago, November 28.

LIGHTING INSTALLATIONS.

READ BEFORE THE NORTHERN (BRITISH) SOCIETY OF ELECTRICAL ENGINEERS, NOVEMBER 12TH, 1894, BY H. A. HENDERSON.

For the purpose of this paper, installations may be divided into two classes, good and bad, but I shall divide the latter into two sub-classes, namely, (*a*) installations which, although they may not be of the best, are still good enough to pass the usual examination and test of the supply companies' inspector, and (*b*) those which do not fulfill this condition. I have not much to say about class I, except that this quality of installation depends upon three essentials, namely, good supervision, good labor and good material.

To my mind the most interesting objects for discussion are included in Class II, so I will at once pass on to these. As we said that good installations depend upon three essentials, so we may say that one of these being absent produces a result contained in either sub-class *a* or *b*. First then, let us briefly touch upon supervision. This is a point upon which I cannot lay too much stress, and I fear it is only too often neglected by just the very class of contractors amongst whom one would expect to find it. The reason of this is not difficult to surmise. It is that the busy contractor cannot spare the time to devote to it that he ought, as he has many inquiries, and special technical work to attend to, which he is unable to trust to his juniors. The immediate effect is that the work being left perhaps under the control of incompetent men, and most of us know what the average wireman does under these circumstances—the installation falls into Class II, and this notwithstanding the fact that the best material may have been supplied. It is, perhaps, unnecessary for me to mention that under these conditions the weak point is, as a rule, bad joints.

Bad joints in an installation are, perhaps, the most difficult faults to find out, as one cannot possibly in the course of an inspection pretend to critically examine every one. Generally the outside appearance is good, and unless the joint be absolutely cut open its weak points are not discovered. There is an example before you of a joint which upon a superficial examination is very good, but it is in reality about as dangerous a combination of unskillful workmanship as one would wish to meet with.

First we find only one point of contact between the conductors, and this probably rendered bad by the presence of rubber, thus we should be certain to get a heating effect owing to the high resistance. Then instead of stripping the braiding, or outer covering of the wire, back, and leaving the vulcanized rubber to form an insulator, the braiding is carefully bound in on to the conductor, and in case of general dampness, would make a fairly easy path for the passage of the current to earth. I may mention that the examples of joints on the table are reproductions of actual ones that I have myself taken out of installations. I am bound, however, to state that these sort of specimens are not often met with now. Out of over 500 installations which I have inspected and tested within the last 18 months only a small percentage were absolutely bad. I have found that the two most dangerous types of contractor to deal with are the plumbing-electric bell-fitter and the "freshman" at the technical school. Two instances of installations carried out respectively by a plumber and a student will suffice to show what I mean. In the first, one of some 18 or 20 lights, a superficial examination seemed satisfactory—that is, the mains and all easily accessible wires were apparently of good quality. The insulation resistance, however, was below 10 ohms and a further investigation revealed the fact that ordinary bell wire of a quality similar to the sample on the table had been used and bedded in new plaster without any casing, tubes, or protection whatever. It was necessary for me to actually dig out the wires before I could discover this. Needless to say, being a very low tender, the contractor lost his money and the confidence of his client.

The second example was a case where the best material had been used and everything done upon the most approved scientific lines, but upon turning on the current the lamps only came up dull red. The reason of this was that the number of lamps being even and on two light electroliers, they were wired in pairs of two in series, "because," as the contractor informed me, "he could not get four wires down the tube of the fitting!"

Such cases as these are, however, I am happy to state, growing fewer day by day. Before I dismiss this portion of my subject I must just add a word or two upon the various systems of wiring premises. In Manchester we are perhaps more favorably situated than in any other town in England, as we have the alternative of wiring either on the three or five wire systems. The latter plan has been adopted with great success in several installations here, notably the Town Hall, Royal Exchange, Free Trade Hall and Reference Library, and the advantage both to the contractor and the consumer is considerable. In the case of the contractor it saves labor, and in the case of the consumer current. There are also many installations wired either on the wire system or on a modification of it, which are very satisfactory and show a considerable saving in copper. I am inclined to think, however, that in the majority of provincial towns the most improved system of wiring is not recognized. As an instance I may state from statistics that over fifty per cent of the installations in Manchester are wired upon the now almost obsolete "tree system." That is, a pair of mains are run throughout the building and lights tapped on indiscriminately as they are required without regard either to the carrying capacity of the leads or the proper protection of the branches by cut-outs. I have come across cases, for instance, where a branch of 18-gauge wire to carry three lights were tapped directly on to a pair of 20's. No doubt the second wireman who was instructed to put on the extra lights was conscientious to a certain extent, but not sufficiently so to pull out the existing tapping and run his 18's direct to the main.

Such proceedings as this do not conduce to the satisfactory adoption of the electric light by the general public, who—and this is a fact we should never lose sight of—are to a great extent ignorant of technical details, and are in the majority of cases entirely in the hands of their contractors.

In my opinion the most satisfactory way of wiring is that which now commonly obtains in London, and has also been adopted by a few provincial contractors, namely, the distribution system, confining oneself as far as possible to five ampere sub-circuits, each controlled by a double pole fuse. The advantage of this to the consumer is considerable, as it allows extra lights to be attached without much extra cost, providing, of course, that the contractor has allowed for this in his mains. Unfortunately, however, it is hard to explain to the prospective consumer that the small additional cost at the outset will probably be of advantage to him later; for a large proportion of the British public are inclined to accept the lowest tender, their object being to put in the light for the present without regard to the future. As to prices at which work is obtained, it would, of course, be invidious on my part to mention any figures, but when one sees, as I have done, variations of as much as 300 per cent in tenders to specification, one cannot help feeling that there is something wrong somewhere.

Of course it may be argued that certain contractors can buy material in a cheaper market than others, but I fear that this is not altogether a satisfactory explanation. One is rather led to the opinion that perhaps low quotations are a bait to catch work by contractors who are not already sufficiently established. There is at present going on in our papers a discussion as to whether certain manufacturers should be contractors. I think with regard to cable manufacturers, that perhaps it is somewhat unfair for them to compete with their clients, as friction is sure to be caused by such a proceeding. The manufacturers of fittings, perhaps, come under a different aspect, as a contractor is frequently asked for a special design or form of fitting which, if he is himself a manufacturer, he can supply at short notice and comparatively moderate cost; whereas, if he has to go to an outside firm, unless he is in a position to order a quantity, such firm will naturally charge him a high price, and the delay in delivery may be considerable.

As far as regards cables and wires the quality is fixed, and one is obliged to employ the particular form and size which is required.

The employment of efficient labor is of very great importance and this brings me to the second essential. I may say that I have had a large and varied experience of the so-called wireman, and a very interesting and curious study I have found him. I suppose there are black sheep in every fold, but I am sure that the wireman's fold is particularly well supplied with the article. One finds among them individuals who seem to be given up to almost every form of vice from which they should be free. It is evident that the employment of these specimens of humanity is sure to result in trouble; yet sometimes the unfortunate contractor has no alternative. In the busy season one is often only too glad to get hold of a man who knows the difference between a double pole cut-out and a main switch, and your average wireman lets you know that he recognizes this by demanding high wages or assuming an independent attitude. Perhaps I may be pardoned for suggesting that a paper on the subject of improving the condition of the electrical labor market would be of great interest, at any rate to a majority of our members.

I will now pass on to the third essential, the use of good material, and I fear that in these days of cheap Continental rubbish, this important point is often neglected. There are at the present time Continental firms who may be said to run English contractors, that is to say, they get hold of a contractor who is short of capital and finance him by supplying him with inferior material, mainly fittings, at a low price. It is a matter for regret that such practices obtain, but I suppose they cannot be improved, except by strict supervision on the part of the supply companies' installation inspector, and even then only to a limited extent, as there are loop-holes in clients who install their own plant and who are thus independent of this sort of criticism. Fittings are a very important factor in keeping up the quality of an installation and one which I fear many supply inspectors neglect.

Often the inspector places too much confidence in his insulation test, or in the quality of the insulation test, or in the quality of the insulating material of wires and cables, without stopping to see if lamp-holders or switches are defective, or proper cut-outs put in where they should be. Either of these points, if neglected, is a source of great annoyance, or maybe danger to the consumer, and allow inferior contractors to obtain jobs at low prices.

Then again, as I have before mentioned, prospective consumers often make a great mistake in accepting a very low tender on the supposition that it is economical to save a few pounds at first. The remedy for this lies in the employment of a consulting engineer. But I fear that even consulting engineers are not altogether free from partiality. When one sees in a specification, for instance, a certain make of switch mentioned, one cannot get away from the feeling that perhaps there is more in it than the mere fact that the particular make of switch is efficient. However, consulting engineers have a great power in controlling the abuses of the trade, and one which I am sure we should all be glad to see more universally used. I fear that perhaps I have dwelt at too great length on some points which may seem trivial, while only briefly touching upon others which have an important significance, but if it should be thought that any portion of my paper is worthy of discussion I feel sure that many of our members would take a lively interest in it, and probably do more justice to this very interesting subject than I have done.

LITERARY.

Mark A. Replogle, an engineer of Cedar Falls, Ia., has issued a pamphlet entitled "Electricity and Water Power and Their Inter-Relations." It is a popular treatise designed to help the business man, the mechanic and the student to form reliable conceptions as to the fundamental principles of electricity and water power. The price of the pamphlet is 25 cents and it may be ordered of the ELECTRICAL REVIEW, 13 Park Row, New York.

Rev. Edward R. Knowles, LL.D., of Worcester, Mass., will soon publish in convenient form his famous brochure of two years ago, "The Supremacy of the Spiritual," together with a supplementary letter on "Electricity." This pamphlet marked a great advance in philosophic research and is extremely original and clear, and much after the style of Cousin. The supplement on "Electricity" is designed to carry the reader as close as possible to a true and rational theory of electricity as a mode of transformation of energy.

The Christmas number of *Scribner's Magazine* presents a remarkable list of popular writers, including Rudyard Kipling, Robert Grant, H. C. Bunner, Brander Matthews and George W. Cable. In illustration it shows a number of novel features. Oliver Herford produces a series of fantastic drawings which are curiously interwoven with the text of Brander Matthews' story in a manner new to magazine illustration. Another notable feature in illustration is the three frontispieces showing the best work of A. B. Frost, Albert Lynch and Emile Friant, each drawing being very original in sentiment and treatment.

TELEGRAPHING WITHOUT WIRES.

BY ERICH RATHENAU, IN "ELECTROTECHNISCHE ZEITSCHRIFT."

Recently several attempts have been made in England to solve the problem of telegraphing between distant points without the employment of metallic conductors. In consequence of the reports which have lately been published in the various electrical journals, I was instructed by the General Electric Society to make a thorough investigation of the various methods which have been used for transmitting signals over interrupted circuits. Pursuant to these instructions, I examined the systems employed by Mr. W. H. Preece, of London, and Mr. Chas. A. Stephenson, of Edinburgh.

The latter, it will be remembered, employs both a static and inductive process. Briefly stated, by alternately charging a cable with positive and negative electricity, he excites currents in a conductor placed at right angles to the charged cable or inductor. It should be noted, however, that the distance between the inducing or primary circuit and the induced or secondary circuit did not exceed 66 yards. Mr. Preece, on the contrary, employed spools of extraordinary dimensions for his inductive telegraphy. The diameter of the coils was 200 yards, and with such enormous apparatus he produced signals in a secondary circuit at a distance of 850 yards.

As is well known, Mr. Preece has also succeeded in establishing telegraphic connection between the coast and outlying islands or signal ships. I refer here especially to his recent experiments between Arran and Kintyre in Scotland, where an inducing circuit of two English miles was constructed about 100 meters above the surface of the ocean. The experimenter states that such an inductor is capable of producing an inductive area of 3,200,000 m^2. In all his experiments telephone receivers took the place of the ordinary Morse sounders.

From a careful study of his work I am convinced that the favorable results attained are largely due to direct current conduction. To verify my opinion, I commenced a course of experimentation, and to prevent inductive effects in the transmission of intelligence, I decided to use a uniform or straight current.

It is a fact, that when a current is sent through two electrodes immersed in a conducting liquid, the electrical equilibrium between these electrodes is not affected in a straight line, but, on the contrary, the stream lines spread out in a manner well illustrated by Fig. 1. Now, if we place in the liquid medium an independent conductor of electricity, it will attract or condense upon its surface a certain number of these stream lines, and these deviated stream lines can be utilized for the excitation of a properly constructed receiving apparatus.

The experiments which I am going to describe are founded upon the physical law which I have mentioned. It is, of course, evident that no inductive phenomena can take place. On the contrary, we deal here with electrical conduction pure and simple. Likewise, the extent of the inducing circuit area and the shape of the inductor are no longer consequential.

Indeed, all we need are two conductors immersed in a liquid; the distance to which electrical effects can be produced is found to depend upon two factors: the available current strength and the distance between the electrodes.

It was thought best to conduct the experiments in the lake "Wannsee," near Potsdam, because an electrical light station is situated near the borders of the lake. The arrangement of circuits is shown in Fig. 1.

In it: AB signifies a battery of 25 accumulators, SU an interrupter driven by a motor, W resistance coils (0 to 24 ohms), AM an amperemeter, VM a voltmeter, T a Morse key, EP two grounded zinc plates, also connected by cable with the poles of the battery. The inductor circuit comprises two zinc plates, E′ P″, suspended by cable from two boats distant from 50 to 100 meters; NN are telephone receivers included in this circuit. For the purpose of transmitting signals intermittent currents were sent from the battery which, by the opening or closing of the Morse key, could be transformed into ordinary signals.

My first aim was to establish experimentally the interdependence of, or relation between the various factors, *i. e.*, the relation between the current strength in the primary circuit and limit of hearing distance for the telephones in the secondary circuit; the effect of various distances between the electrodes E P upon the clearness of the transmission of signals in the secondary circuit; to find the distance between the plates suspended from the boats which gave the most satisfactory audible effect in the telephone receivers; finally, the effect of altering the shape and size of the electrodes.

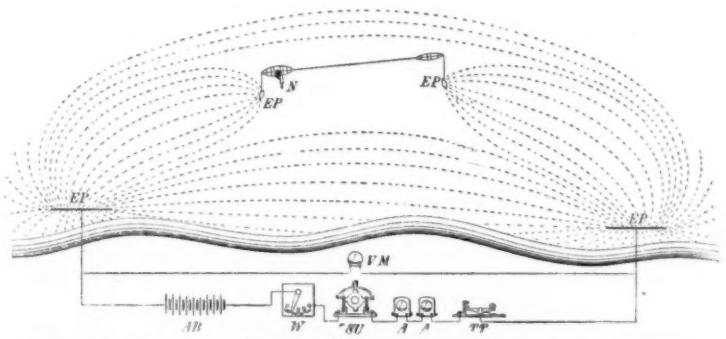

FIG. 1.—TELEGRAPHING WITHOUT WIRES.—SHOWING SPREAD OF ELECTRICAL STREAM LINES.

On account of the non-delivery of some apparatus especially designed for these tests, the average current strength sent through the water did not exceed three amperes with 150 intermissions or current impulses per second. Again, the water of the Wansee containing but a very small admixture of mineral salts, it offered a very high resistance to the electrode surfaces, so that I found it necessary to enlarge the zinc plates to 15 m^2 in order to produce a current density of three amperes.

For this experiment the distance between the primary electrodes was about 1,500 feet, and no difficulty was encountered in the exchange of intelligence between the electric light station and the village of Neu Cladow, a distance of three miles. The sounds in the receiving telephone resembled a soft humming or buzzing noise, but the telegraph operators read them without any trouble. By slightly changing the ordinary construction of the telephone, signals can be transmitted over a much longer distance.

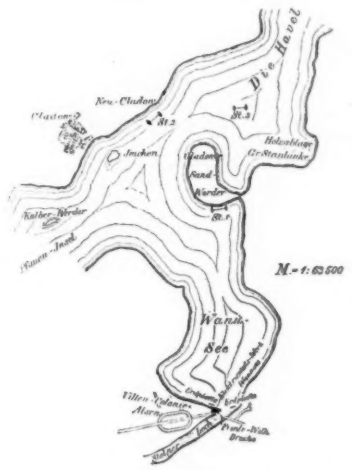

FIG. 2.—TELEGRAPHING WITHOUT WIRES.—MAP SHOWING LOCATION OF RATHENAU'S EXPERIMENT.

Lord Rayleigh has stated that the sensitiveness of the telephone for currents with 600 reversals per second is about 600 times greater than for currents having but 130 reversals per second, but in my experiments the number of impulses employed did not exceed 150 per second. To get the best possible result in this system of transmission, a telephone should be used having a carefully tuned metallic tongue in place of the ordinary iron disk. Moreover, knowing the number of current breaks in the primary circuit, the tongue should be so tuned as to vibrate in unison with that number, thereby producing much more distinct signals. It does not seem necessary to point out here that by the use of several current generators, each one producing a definite number of current impulses, a number of non-interfering messages may be sent through the water to distant telephones, each being constructed to respond to but one definite rate of vibration; or by means of one current generator a message may be sent to several distant telephone receivers.

I may, however, point out that the resistance of the receiving circuit should be as small as possible. At first I found it difficult to produce a call in the distant receivers, but this apparently knotty problem may be solved by attaching a microphone to the membrane of the receiver, which, acting upon a relay in a local circuit, produces the call.

The usefulness of the above described method of transmission would be much increased if means can be found to produce a written message. On the suggestion of Dr. Rubens an apparatus is now being constructed, generally on the plan of Dr. Wien's optical telephone. It is expected that the use of this apparatus will enable us to transform the acoustical into optical signals and to register these photographically. To increase the signaling distance, I advise the use of:

1. Great current strength in the primary circuit.
2. Increasing the distance between the primary electrodes.
3. Increasing the distance between the receiving electrodes.
4. Replacing the metallic diaphragm of the telephone receiver by a light tongue.
5. Which should be tuned to respond to a definite rate of vibration.

I am convinced that by skillfully selecting the proper apparatus, the problem of telegraphing without wires between considerable distances offers no further practical difficulty.

B.

Electric Power From Niagara Falls.

The big generators for the electric power transmission plant at Niagara Falls have been tested at the Pittsburgh shops of the Westinghouse Electric and Manufacturing Company and are expected to arrive at Niagara Falls this week. As soon as they can be set up the transmission of power to Niagara Falls and immediate vicinity will begin. The first customer to be supplied will be the Pittsburgh Reduction Company, whose aluminum works are about half a mile from the electric plant at the Falls. The Carborundum Company, whose works are also at the Falls, will be the next customer supplied.

Queen & Company Sued for Infringement.

The Weston Electrical Instrument Company, of Newark, N. J., has filed complaint in the United States Circuit Court against Queen & Company, of Philadelphia, alleging infringement on the plaintiff's patented apparatus for the measurement of electricity, and on its patented galvanic batteries.

How She Knew His Telegram.

She had sent off a telegram and was waiting for an answer. Suddenly the peculiar halting click of the receiving machine sounded in the office, and she said to her companion: "That's from George, I know; I can tell his stutter."—*Philadelphia Times.*

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A WORD OF CAUTION.

The large amount of electric railway and central station work which is promised as soon as the Spring season opens makes it necessary that a word of caution be spoken before the rush of actual work begins. Let the promoters of these new enterprises be sure that a demand exists or can surely be created for the electric railway or central station they have in mind. This firmly fixed, let them look to their finances and see that they are in proper shape before the new company is launched. The days of wild-cat speculation and building large stations on credit is past. For two years the electrical field has been passing through the fire of experience. The mushroom growth and dead wood have been pretty well scorched out. We want no more of it. Caution in organizing new enterprises and business sense in managing them are just as necessary here as in any other industry. Electrical engineers and contractors are at last beginning to realize that there is no good reason for making stockbrokers and financiers of themselves, in addition to their legitimate business. Those who have done this and succeeded are few.

If a man comes to you and says, "I'll give you the contract to build this road if you'll float the bonds," tell him to do his own floating or give the job to someone else. You don't want it. What you are after is a cash buyer or one with such backing as will insure your money when the work is finished. The salvation of electrical contractors depends in a very large measure on their sticking to their own business and allowing the proper persons to do everything else.

The importance of the correct and rapid transmission of orders and signals on a ship cannot be over-estimated. The best means for accomplishing this is the telephone. Several marine telephone sets made by the American Bell Telephone Company are described elsewhere in this issue of the ELECTRICAL REVIEW. They have been tried in service and not found wanting.

Traveling salesmen for electrical firms report that a noticeable improvement in the business situation exists and that the outlook for a heavy trade in the Spring is encouraging.

Mr. S. D. Greene's paper on the uses of electricity on shipboard is concluded in this issue. He describes fully that wonderful instrument, the Fiske electric range-finder.

STEAM GENERATION FROM HOT SLAG FOR ELECTRIC PLANTS.

An industrial contemporary records the fact that the extraction of heat from melted slag for steam making purposes has been successfully accomplished in New South Wales, Australia. The slag is poured from an ordinary furnace into tubes set vertically through a boiler shell, the diameter of the tubes increasing toward the lower end. The heat passes through the tubes to the surrounding water. The solidified contents of the tubes, together with the skins which form upon the dumping pots, are delivered to a wrought iron car passing below the boiler, and the feed water is passed over them. The output of slag from one 112 by 60 inch silver-lead furnace furnished 60 horse-power of steam at Broken Hill, where the experiment was tried.

It has been suggested that the economical generation of steam after this method could be applied to the generation of electricity for long-distance transmission. We can see no advantages in the suggestion. Slag is made at but comparatively few places, and while steam might be made cheaply at these, it would be a matter for owners of furnaces only and not of general interest. It is not as if the red hot slag ran out of a hill side all ready *pro bono publico*.

A SUGGESTION FOR NEW YORK—BROOKLYN RAPID TRANSIT.

Now that the Greater New York has been voted for, means should at once be devised to bring Brooklyn and New York into closer relation by means of an interurban rapid transit system. We suggest that it is possible to run both way and express trains on the Third Avenue Elevated road in New York city, then over the Brooklyn Bridge on to the tracks of either of the Brooklyn elevated roads terminating at the Bridge. A Brooklyn man doing business up town in New York city could then make the trip without a single change of cars. As it is now he must make two changes. Electricity should be used as the motive power on such a road.

If the track gauges on the three lines mentioned are not standard they could easily be made so. The running of such trains would not interfere with the operation of the Bridge cars on the cable system, because there would not be so great a demand for trains running only on the Bridge. Then, too, it is safe to predict that before many years electric power will have superseded the cable system on the Bridge. A Greater New York rapid transit road would do more good for the development of New York and Brooklyn than almost anything else.

Wall Street and the Electrical Stock Market.

The third week of the bear market has just closed. In many respects it was an expression of disappointment on the part of capitalists over the failure of the election and the government bond issue to immediately stimulate business activity. Not until the latter days of this period was there any considerable amount of liquidation, and even then only in those stocks whose dividends have been or seem likely to be reduced. An absence of the selling of long stock naturally added to the short interest, until it has reached a point where it has become unwieldy and promises a sharp covering movement next week. In fact, signs of buying for short account were manifest today. In this downward movement the railroad shares have been the leaders, and it was not until Friday that the Industrials weakened. The attention of speculators has been confined almost exclusively to the leading railroad stocks, while that of investors has been taken up by the government bond issue. This naturally contributed to the neglect of inactive issues, among which may be classed the electrical stocks. Barring General Electric there has been hardly a ripple of interest in the latter class.

I find that there is a growing sentiment in favor of investments in street railway stocks and bonds. Publications of the class of *Poor's Manual* and the *Chronicle* have of late devoted more or less space to statistics relating to these properties. It is already having the result of bringing them more prominently before the public. There is no question of doubt that as a medium of conservative and sure investment these securities take high rank. They are desirable for the additional reason that the developments of the street railway business, unlike that of steam roads, has only just started, and that the possibilities are immense. The one factor which has done more than all others to keep away investors is the lack of full data regarding earnings and operating expenses.

General Electric was very quiet between 34¾ and 35½. Every evidence is at hand that the company is doing a large and steadily increasing business. Advices from the Lynn plant are to the effect that it has not cut wages as reported. It has increased the number of its employés. The company, I understand, has $600,000 cash on hand, and in addition $250,000 cash to pay the next semi-annual bond interest. It has been employing its surplus to retire its debenture bonds, and has bought about $1,000,000 of them at a cost of $870,000. An evidence of the company's prosperity is the recent purchase of 2,000,000 pounds of Lake copper.

American Bell Telephone has issued a circular announcing that the 5,000 shares of new stock at 190 will be ready for delivery January 5. The rights are one share of the new for 40 shares of the old. The subscription may be assigned, but the liability rests with the assignee. The rights to subscribe will expire at 2 o'clock December 22. No interest is to be allowed on sums paid in advance.

The stock lost a point on limited transactions, selling at 195.

On the Boston Stock Exchange, Erie Telephone was unchanged at 52; General Electric preferred advanced 3 points, touching 70; New England Telephone was steady between 66 and 67; there was no change in Fort Wayne Electric; Westinghouse common advanced 1 point, and the preferred lost a point.

Of the inactive stocks on the New York Stock Exchange, American Telegraph and Cable was bid 89½; Postal Telegraph was bid 50 and held at 55; North American sold between 4 and 4⅝; Edison Electric Illuminating of New York recorded two sales, one at 99 and the other at 100.

Electric Storage, a Philadelphia stock, is attracting considerable attention. The capital is $12,000,000. Its owners are very enthusiastic, and claim that telegraph and electrical companies will find it of great benefit to their business. BAIN.

New York, December 1.

PERSONAL.

Mr. P. B. Delany, the well-known electrician, has returned from London and will reside at South Orange, N. J.

Mr. F. Z. Maguire is in London successfully managing the large kinetoscope business in that great city.

The reorganized Consolidated Traction Company of New Jersey has re-elected E. F. C. Young president. The advisory board consists of A. J. Cassatt, P. A. B. Widener, John D. Crimmins and B. M. Shanley.

At the annual meeting of the Superior, Wis., Water, Light and Power Company, ex-Governor W. R. Merriam, of Minnesota, was elected president to fill the vacancy occasioned by the death of A. H. Wilder.

John B. Wood, vice-president of the Holmes Electric Protection Company, Montreal, Que., was sentenced last week to pay $50 fine for conspiring to destroy the business of the Dominion Burglary Guarantee Company by cutting its wires.

Mr. J. H. McGraw, of the *Street Railway Journal*, and Mr. Frank X. Cicott, of the Pettingell-Andrews Company, Boston, sailed for Europe last Saturday on the "Lucania" for a six weeks' trip. They expect to spend Christmas in Paris. Mr. Cicott will visit England in connection with the Pettingell-Andrews Company's girder rail business with Messrs. Dick, Kerr & Company, Limited, London.

Engineering Association of the South.

The following officers of the association have been elected for the ensuing year: President, Prof. W. L. Dudley; vice-president, W. F. Foster; secretary, W. B. Ross; treasurer, W. M. Leftwich; directors from Tennessee, John Biddle, W. T. Magruder, E. C. Lewis; director from Georgia, A. V. Gude; director from Kentucky, C. O. Bradford.

A Big Electric Railway Deal in New Jersey.

It was reported last Saturday that a big electric traction deal was made public at Trenton, N. J., on November 30, when Chancellor McGill granted an injunction restraining the leasing of the Trenton Passenger Railway Company, Consolidated, to the Trenton Traction Company, a corporation existing only on paper, but which was to have been incorporated on November 30 after the lease was ratified.

The injunction was obtained by Samuel K. Wilson, of Trenton, the largest single stockholder in the Passenger Railway Company, who owns $500,000 worth of its stock and is an endorser on $40,000 of its paper, which has gone to protest, and on $40,000 more that is not yet due. Mr. Wilson, in his application, declares that he knew nothing of the proposed deal until Monday, and had no official notice until Wednesday, when he received notifications of a directors' and stockholders' meeting to be held to-day. Both notices were dated November 21, but the envelope was postmarked November 28. They declared the objects of the meetings to be the consideration of the proposed lease and an increase of the bonded indebtedness from $1,000,000 to $2,000,000.

The lease proposed is for 999 years, in return for guaranteed dividends ranging from $1.50 to $4 a share for the first eight years and $4 per share thereafter.

It is learned that the incorporators of the New Trenton Traction Company will include Thomas Barr, of Newark, E. J. Moore, of the Philadelphia Traction Company, General William S. Stryker, Judge Robert S. Woodruff, Colonel A. R. Kuser, John L. Kuser and Hugh H. Hamill, of Trenton. They say they control already a majority of the stock of the Passenger Railway Company, and believe the lease will be ratified at a postponed meeting to be held this week. The Trenton street railways form an important link in the projected line from New York to Philadelphia, and their acquisition by the new corporation is generally believed to be in the interest of the New York and Philadelphia Traction Company.

Tax Assessments in New York City.

Decisions were handed down last week in New York city, in the Special Term of the Supreme Court by Judge Beach, reducing the assessment of the Metropolitan Traction Company from $173,749 to $75,000. Judge Beach also denied the motion of the Corporation Counsel to quash writs of certiorari obtained by the General Electric Company, the Edison General Electric Company and the Edison Electric Light Company for the purpose of reviewing the personal tax assessments imposed for 1894.

The new power house for the South Jersey Traction Company at Bridgeton, N. J., is completed.

A Maiden's Lament.

[*By Captain Jack Crawford, the "Poet Scout," in Truth.*]

I'd like to choke the fellow who invented electricity,
And scattered incandescent lamps the wide world o'er,
For now the people all believe the things are a necessity,
And they have banished kerosene forevermore.
I'd like to see him shut up in the strongest penitentiary
For dealing us poor maidens such a vicious blow,
Because that new invention of this hateful nineteenth century
On some occasions can't be turned—
away—down—low.

You turn the little thingumbob and every glimmer vanishes,
And leaves the maiden and her beau in Stygian gloom,
And maiden who will sit with man in total darkness banishes
All modesty, and gives the tongue of scandal room.
A dim, subdued, religious light but adds to the felicity
Of two within whose hearts the germs of true love grow,
And men will venture many a pure and proper eccentricity
They'd not unless the light was turned—
away—down—low.

I'm sure that hateful Edison must cherish animosity
Against we youthful lovers—it's a burning shame—
And I have not a bit of doubt he giggles with ferocity
To think how very neatly he has blocked our game.
I've pictured him an ogre with whom true love is impossible,
He's a surly dog-in-manger sort of chap, I know,
And never sparked a pretty girl whose pouting lips were bussable
At even when the lamp was turned—
away—down—low.

Gibbons's Resuscitator Tried on a Cow.

A New York evening paper last Wednesday published a story to the effect that an amateur electrician of Jersey City, N. J., had tried Dr. Gibbons's resuscitator on a cow that had received a severe electric shock. The article stated that a cow was bought for $7 and was subjected to a shock of 1,000 volts and five amperes. The cow dropped in her tracks instantly and remained apparently dead after the current had been applied for a minute and a half. The current was shut off and then applied for two minutes more. After waiting 10 minutes Dr. Gibbons's bellows apparatus was put in operation on the cow. At the end of six minutes the cow showed signs of life and soon after struggled to her feet. Dr. Gibbons's apparatus was described and illustrated in the ELECTRICAL REVIEW last week.

No Charge for This—Who Will Get the Order?

TO THE EDITOR OF ELECTRICAL REVIEW:

We desire to purchase an arc light dynamo with capacity of 50 1,200 candle-power lamps and 25 double arc lamps, new or second hand, in good order.

We would be pleased to have you mention this in your paper, and will pay charges for same on receipt of bill.

Respectfully,
AMERICUS ILL. AND POWER CO.
J. H. H.

Americus, Ga., November 26.

The Buffalo, N. Y., *Times* is making a plea for cheaper street car fares on the ground that prices for all commodities have declined during the last two years.

ELECTRICITY ON SHIPBOARD—ITS PRESENT POSITION AND FUTURE DEVELOPMENT.

READ BEFORE THE SOCIETY OF NAVAL ARCHITECTS AND MARINE ENGINEERS, NEW YORK, NOVEMBER 16, 1894, BY S. DANA GREENE, LATE ENSIGN UNITED STATES NAVY, ASSOCIATE.

(*Concluded from page 265.*)

II.—FUTURE DEVELOPMENT—ELECTRIC MOTORS.

The use of the electric motor is probably the most important development to be looked for aboard ship. On shore, where millions of dollars are now invested in single central station plants, the constant endeavor of the management is to make this investment more productive by keeping the machinery in operation with a paying load for as many hours out of the 24 as possible. During the day the percentage of lights in use is very small and current is, therefore, sold for power purposes, thousands of horse-power being thus connected in small units to the lighting circuits of the station. The advantages of the electric motor are now too well known to need repetition, and with the improvement that has been made during the past two years in their durability and adaptability for special applications there are many places aboard ships where they can replace the auxiliary steam engines with a saving of expense in first cost and operation and in space and weight. For military purposes they can be used to advantage:

1. For ammunition hoists.
2. For handling the turrets of battle ships and monitors and also the heavy guns in these turrets.
3. For torpedo discharge apparatus.

Hydraulic or compressed air machinery has been largely used for this work in the past, and in this connection the following editorial, which appeared about a year and a half ago in an English technical journal of high standing, is significant:

"Up to the present we have not felt able to advocate the general use of electric motors in place of hydraulic gear or auxiliary steam engines on board ship, but the effect of the recent frost on the "Benbow" discloses a weak point in hydraulic machinery which has no parallel in electric work. The gear of the heavy guns has been not only disabled, but has suffered such serious injury that it has been found necessary to take the greater portion of it to pieces, and to forward it to the manufacturers for reconstruction and repair."

Foreign navies have adopted electric motors for gun, turret and hoist work quite extensively, and a number of ammunition hoists have recently been ordered for our own ships, while the turrets of the new battle ships will, in all probability, be operated entirely by electric motors.

For general purposes electric motors can be used to advantage for:

1. Ventilating blowers.
2. Portable drills.
3. Portable pumps.
4. Operating machinery in engineer's machine shop.
5. Deck hoists, which are located at some distance from the boilers.
6. Operating valve of steam steering engine, and thus doing away with the long and awkward mechanical connection between steering wheel and rudder. The writer is of the opinion that a motor will eventually replace the steam steering engine itself. It requires about 15 horse-power only, and the application can be made successful.
7. Opening and closing of water-tight doors. This application is simple and would greatly facilitate the prompt closing of doors in an emergency, either from the bridge or from any other desired point. If the water-tight doors of the ill-fated "Victoria" had been thus equipped, they could have been closed within the 60 seconds immediately preceding the collision (when the order to close doors was given) and the ship might have been saved.*
8. Driving ice machinery.

There are certain auxiliary steam engines that it is inadvisable to attempt to replace with electric motors; thus the auxiliaries in the engine and boiler room spaces (including blowers, ash hoists and certain spar deck hoists) require only short lengths of steam piping, and the conditions of service in the boiler and engine rooms are very trying to a motor; again the anchor engine requires from 40 horse-power to 50 horse-power, and if a motor is used, the generator and wiring capacity of the plant must be considerably increased, while the motor is needed occasionally only and cannot be used for other purposes.

Such a general introduction of electric motors as here recommended necessitates an increase in the capacity of the generating plant of from 30 to 60 horse-power (the heavy turret turning machinery having its own plant) depending upon the number of motors used, but this increase can be provided for in the existing dynamo rooms of all larger vessels, and the advantages derived warrant the additional expense. A modern vessel is filled with steam and exhaust pipes running to the auxiliary engines; where they pass through living spaces they are a great discomfort; they are in constant need of repairs, and they are a menace to life in case of accidental bursting or breaking. Electric wires take up much less room, do not easily get out of order, and do not injure any one if they do get out of order. The electric motor is cleaner, quieter, lighter and more compact than any other form of motor; they are in daily use on shore for many of the purposes enumerated, and there is no reason why their use should not be equally successful on board ship.

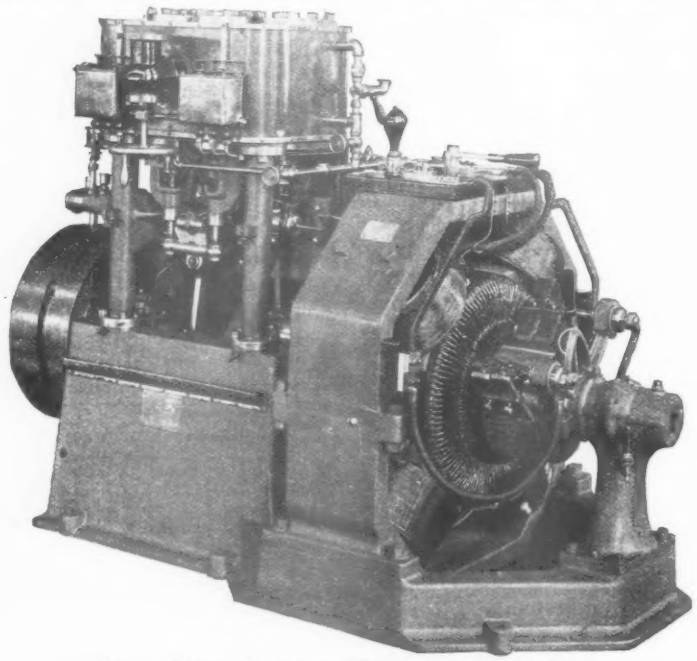

FIG. 1.—DIRECT CONNECTED MARINE COMBINATION SET.

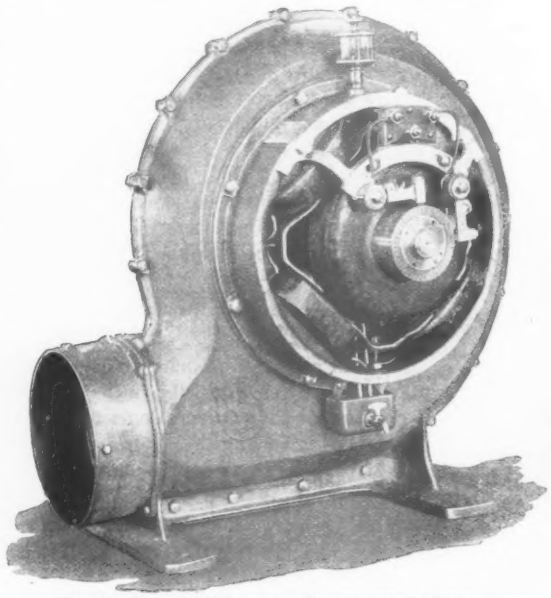

FIG. 2.—DIRECT CONNECTED MOTOR AND BLOWER.

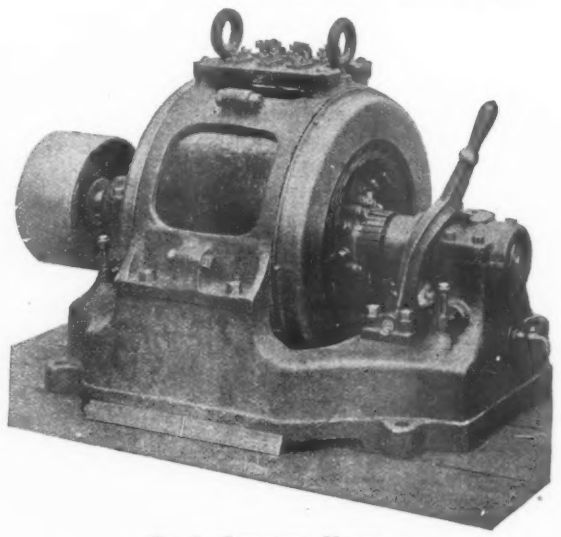

FIG. 3.—INDUCTION MOTOR.

SEARCH LIGHTS.

Search lights have been in use on war vessels as a military weapon of offense and defense for several years, but their use as an aid to navigation is recent. Vessels now passing through the Suez Canal use their search lights and so make as rapid progress at night as in the day time. Vessels plying between New York and Savannah use their search lights in running up the Savannah River at night, and frequently save twelve hours' time from dock to dock in so doing. The Sound steamers throw the beam of their lights overhead in a fog, and the location of the vessel is indicated by a well defined luminous spot in the fog. The search light is frequently used for coaling ship or making repairs at night. These examples sufficiently indicate the uses to which an intelligent captain can put his search light. The general appearance, construction and operation of search lights has been greatly improved of late. There are two general types: Those controlled by hand, requiring a man constantly at the projector, and those controlled by electric motors, so that an observer standing at a distance from the projector can, by means of a control stand, throw the beam of light at any desired angle of azimuth or elevation. The hand control is cheaper, and has generally proved more reliable in service, but recent improvements in the electrically controlled projectors for the navy have so simplified them and increased their simplicity of operation, that the arguments in favor of their general use have been greatly strengthened. The projectors should be placed well above the level of rails, guns, boats, etc., and in such a position as to command the greatest uninterrupted sweep around the horizon. The French have tried the experiment of placing the projector close to the water line, either by mounting it at a lower deck port, or by hanging it from an overhead support outside the ship. Theoretically, the area of contact of the beam of light on the water is increased by this arrangement, and this is doubtless true in practice when the ship is at anchor in a harbor on a calm night. If the attempt, however, is made to use the projector in this position with the ship under way, it does not seem possible that it can escape injury from the waves nor that the beam of light will not be frequently shut in by the intervening seas.

THE RANGE OR POSITION FINDER.

An instrument which will indicate quickly and with reasonable accuracy the distance of objects within the range of vision at sea is obviously of great advantage, both on account of its military value to a war vessel and as an aid to navigation in coasting or making land. Several range finders have been devised both here and abroad, but by far the most complete apparatus is that invented by Lieu-

*Captain Bourke testified before the Court of Inquiry that it required *three minutes* with a trained crew and under ordinary drill conditions, to close the doors of the "Victoria."

tenant Bradley A. Fiske, United States Navy.

This beautiful instrument, after tests extending over a period of five years, has just been officially approved and adopted by the Navy Department, and it has been adopted by several foreign governments as well. The following extracts from an official report of the commanding officer of the "San Francisco" show what it will do in actual service:

"In January last, when at Pernambuco, Brazil, I sent to the Department a tabulated record of the errors of the range finder as determined in the various parts where the true distances could be gotten from the charts. The average error of all the observations was about six-tenths of one per cent per thousand yards. Since that time I have always made use of the range finder at target practice, and in going into and out of port and in coasting. The range finder is thoroughly adapted to ship use, as is shown by the fact that its whole care and service are in the hands of three apprentice boys. These boys keep it in order, and go to it as their station at general quarters, getting under way and anchoring, and whenever the word is passed, 'Man the range finder.'

"The range finders keep in order with almost no care whatever. There is a transmitter in the conning tower —one reading instrument in the starboard gangway—another reading instrument on the poop. The quiet and orderliness of target practice would be much increased if two reading instruments were added—one for the port gangway and one for the forecastle."

This report shows that the instrument is accurate and easily kept in order. In its construction, the principle of the well-known Wheatstone bridge is applied very cleverly. Two standards, as shown in the cut, are firmly secured to the deck, at the ends of a base line of known length. The standards are connected to each other and to a central point (usually the conning tower) by proper wires, there being also a telephonic connection between all these stations. Each standard carries a telescope, fitted with an electric contact and pivoted so as to travel over a graduated metallic arc. The diagram (Fig. 4) shows the usual connections. The galvanometer in the circuit is located at one of the standards. As the telescopes are directed on the same object, (communication being constantly maintained between the two stations by telephone) they take different positions on the arcs, and a deflection is produced on the galvanometer, which deflection is proportional to the distance of the object. By trigonometry, the distances are determined for different angular positions of the telescopes and the galvanometer is then graduated to read the distance direct in yards.

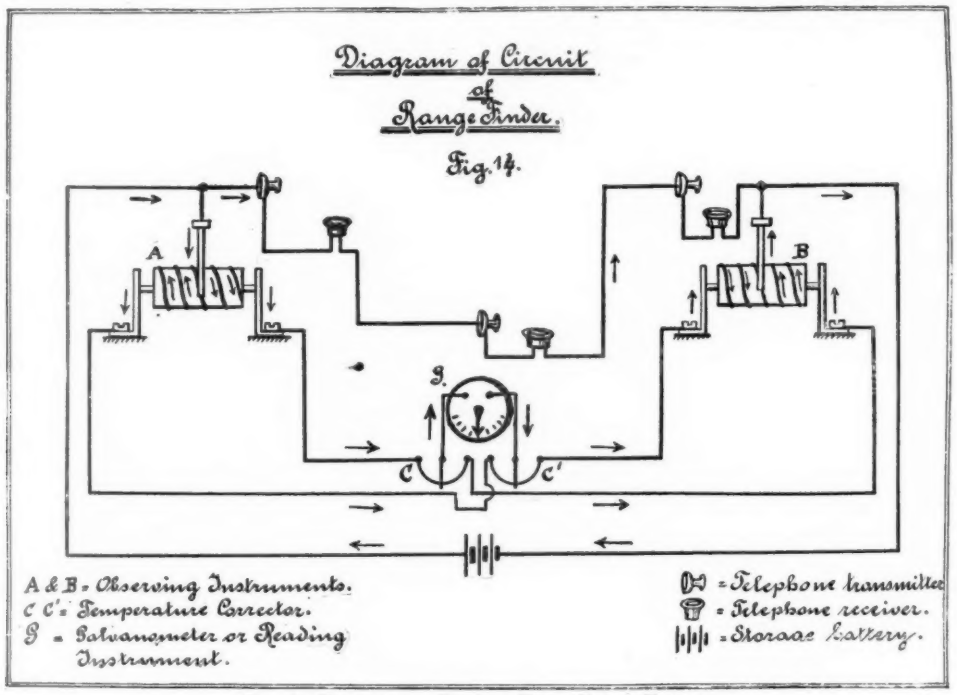

FIG. 4.—DIAGRAM OF CIRCUIT, FISKE RANGE FINDER.

This distance is reported from the principal observing station to the conning tower by telephone and is then telegraphed to indicators (see cut) placed conveniently about the decks. In future naval engagements the range finder will play an important part and it may be a controlling factor in determining a victory, while in the field of navigation its use will be steadily extended.

SIGNALLING AND FIRING CIRCUITS.

For night signals the navy has recently adopted an improved form of the Ardois system suggested by Lieutenant A. P. Niblack, United States Navy. Four double lanterns, each lantern being colored half red and half white, are strung on a jackstay at the mizzenmast, the interval between the lanterns being 12 feet. An incandescent lamp is placed in each half of each lantern and connected by cable to a signal stand, which is mounted on deck as desired. Various combinations of red and white lights are then flashed by a suitable switch at the signal stand and the lights are burned until the signal is reproduced on all the answering ships. Another switch is used to "blink" the upper light, thus indicating some special code signal. This system is rapid and very satisfactory up to distances of three to five miles. For "wig-wag" signalling, between two vessels, a very neat, double, masthead lantern has been developed, the red and white lights being flashed in succession by a suitable key. A "multiple fibre" incandescent lamp has been recently brought out in England for use with these masthead lanterns, the individual fibres, or filaments, being so fine that they lose their incandescence immediately the current is cut off. With the usual single filament lamp there is an after-glow, when the circuit is opened, which is sometimes confusing in rapid signalling. The search light provides an excellent means of long distance signalling, the beam of light being thrown overhead and waved to right or left. It has been reported that English war vessels have communicated successfully in this way, in Chinese waters, when more than 50 miles apart.

Electric firing circuits for firing the guns and torpedoes of war vessels will undoubtedly be used in the future; these circuits are so aranged that indicators at each gun and in the conning tower show when the gun is laid and ready for firing. The act of firing can then be performed by the pressing of a button in the hands of the gun captain or of the commanding officer, as may be desired. Such an arrangement will be appreciated for broadside or combination firing at close quarters.

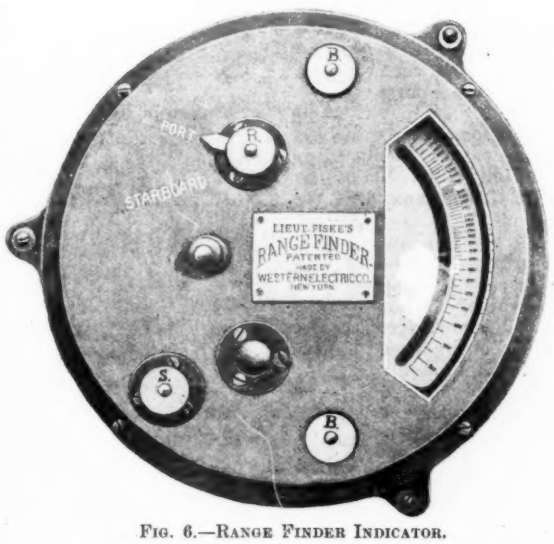

FIG. 6.—RANGE FINDER INDICATOR.

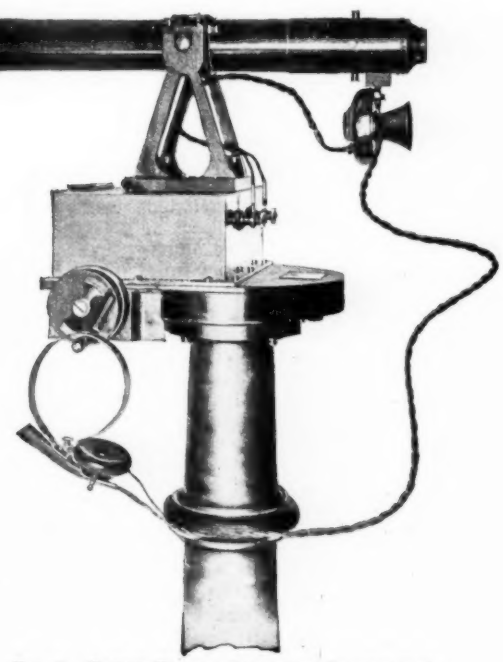

FIG. 7.—RANGE FINDER OBSERVING INSTRUMENT.

ELECTRIC LOGS.

The French Navy has recently adopted an electric log, the invention of Rear Admiral Fleuriais. A set of revolving vanes on the log impart, through worm gearing, motion to an ivory disk mounted in the log, and a spring makes contact with metallic plates placed at intervals on the rim of this disk. As this contact takes place a bell is sounded aboard ship, once for every 24 revolutions of the vanes. The interval between signals is arranged 11 seconds for eight knots, 8.8 seconds for 10 knots, 4.4 seconds for 20 knots, and is, therefore, of sufficient length to prevent errors. To indicate fractions of a second, the usual sand glass has been displaced by a pendulum indicator which beats at intervals of two-tenths of a second, and which is started at the moment of taking an observation. A mistake of half a second, with a period of 50 seconds, makes an error of only one-tenth of a knot in the speed of the vessel; if the observation is prolonged, the error is reduced. The apparatus is simple and apparently gives good satisfaction. The log is about nine and three-fourths inches in diameter and is not water-tight.

THE ELECTRIC STEERING COMPASS.

Another French invention, by Lieutenant Bersier, French Navy, which will probably be introduced aboard ship, is the steering compass. Its object is to keep a ship on her course automatically and without the constant manipulation of the wheel in the hands of the helmsman. The following brief description of the device is taken from a recent technical journal. The electric spark of a Ruhmkorff coil is made to unite a pointer on the circumference of the compass card with either one of two semi-cylindrical metallic plates, which are electrically insulated from each other and from the

side of the compass box or binnacle. The coil is placed a few yards from the compass and is supplied by an alternating current of from two to three amperes. The induced current of the secondary coil reaches the pivot of the compass through a flexible wire, and passes thence to the aluminum capsule that carries the sapphire, and follows along an aluminum wire or pointer which forms a radius of the north pole of the compass. As the ship deviates to the right or left of her course, the current leaps (through a distance of about an inch) from the pointer to the right or left hand insulated plate in the binnacle, and thence flows through one of the two electro-magnets, which, in turn, close the circuit, in one direction of rotation or the other, of a small 150 watt motor. The shaft of this motor is keyed to the shaft of the rudder motor, which moves the rudder in the direction required to bring the ship back to her course. It is reported that the compass card is entirely uninjured by the current or spark, and that the device has been tested in squadron practice for two months with complete success.

MEANS OF COMMUNICATION.

Rapid communication or exchange of orders between distant parts of a large vessel is quite a problem. Verbal commands will not carry and the person to be communicated with is usually out of sight. Electric gongs and bells are useful as calls, and speaking tubes are largely used. On the "New York" there is a speaking tube "exchange" below the protective deck and under the conning tower. Some 20 or 30 tubes converge at this point and connection is made between their ends by a short length of flexible tube, so that the commanding officers by calling the "exchange" operator can have his single tube connected with any other tube and *vice versa*. This system is crude, however, and the operator must be sorely perplexed when a number of calls are "blown in" at once. There is no way of distinguishing where the calls come from, unless the operator has a sufficiently musical ear to detect a difference in the notes of the tube whistles.

A far better system would be to have a direct telephonic connection between the conning tower and such other points as are desired, without any "exchange" at all. Such systems are now installed in many large office buildings and industrial establishments and give great satisfaction. Telephones have been tested aboard ship and found to be entirely reliable, and an order can be given clearly by telephone that could not be understood at all through a speaking tube, especially when there is much noise or confusion at either or both ends of the line.

Electric engine revolution counters and direction indicators, thermostatic coal bunker indicators and helm indicators have recently been successfully developed. They are simple in construction and easy to operate. Some of these appliances, devised by Lieutenant Fiske, are now being installed on board the "New York." The mechanical engine room telegraph signals now used for transmitting orders from the bridge to the engine room are a great improvement over the old gong and bell pull, but their installation is expensive and their operation not always certain, on account of the many changes of direction in the lead of the link chains connecting the instruments on the bridge and in the engine room.

An electric telegraph signal will soon displace the mechanical device. Several such instruments have already been made and tested, both in this country and in Europe, with satisfactory results. A set of these instruments is also being installed aboard the "New York."

STORAGE BATTERIES OR ACCUMULATORS.

Storage batteries are largely used on shore, for both central station and isolated plants, and their manufacture has been much improved of late. Guarantees of six per cent per annum depreciation can be secured from responsible manufacturers, and the care and operation of the batteries does not require specially skilled labor. The objections to their use aboard ship are their great weight and the presence of an acid solution, which gives off acid fumes. The weight is being gradually diminished with successive improvements, and the batteries can be fitted with watertight covers to prevent slopping, while the fumes can be removed by proper ventilation. They have the advantages for ship use that there is no moving machinery about them, they need not necessarily be placed in the dynamo room, they can be charged at any time during periods of light load, and when the heavy load comes on they can be used to help out the plant. They will probably find a proper field of usefulness aboard ship in the future.

ALTERNATING CURRENT APPARATUS.

The development of alternating current apparatus suitable for the simultaneous operation of indcandescent lights, arc lights and induction motors has emphasized the advantages of this type of apparatus and has greatly extended its sphere of usefulness on shore. The alternating current induction motor (see Fig. 3) has all the advantages of the direct current motor, with the great additional feature of having no commutator or brushes. It has become very popular during the last year, and if the use of motors aboard ship continues to grow it is quite possible that the future ship plants will be installed on the alternating current system.

STEAM TURBINES.

Considerable attention has been attracted in England to the possible use of steam turbines directly coupled to dynamos. Their great compactness and simplicity of construction makes them particularly suitable for marine plants, while their comparative high speed permits of the use of a very cheap dynamo, for in dynamo construction the cost of manufacture varies almost inversely as the speed. Several shore plants using the direct connected steam turbine have been installed in England, and the reports thus far are very favorable. If they prove reliable in service some sacrifice of steam efficiency can well be afforded with their introduction aboard ship on account of their many compensating advantages.

In conclusion, a few words about the handling of the plant may not be out of place. The proper operation and care of electric machinery do not call for great technical knowledge, but they do demand the entire time and attention of a few thoroughly trained, practical men. Our seamen gunners in the navy are now trained for this work by an excellent course of practical instruction at the naval torpedo station at Newport, and that these men have the right kind of training is shown by the fact that several of them have left the service to accept offers of more lucrative and important private positions on shore. Men for the merchant marine should have a similar training, and good men can be selected from those who have had practice in operating shore plants.

Applied electricity is a fascinating study, for its possibilities seem almost unlimited; but electric machinery, in common with all other classes of machinery, must always depend for its successful operation upon a reasonable exercise of human intelligence in its care and supervision.

ELECTRIC LIGHT FLASHES.

Chagrin Falls, Ohio, will have electric lights. Gasoline has been used for years.

Middletown, Ohio, has voted by a large majority to own its own electric light plant.

Willoughby, Ohio, has voted to purchase an electric light plant by a decisive majority.

The Edison Illuminating Company, of Hazelton, Pa., has declared a four per cent dividend.

The almshouse at Springfield, Mass., will probably be supplied with an electric light plant.

Palmyra, N. Y., will soon be supplied with electric lights by the plant located at Canandaigua.

The electric light plant of Renovo, Pa., is to be enlarged by the erection of a new building 50x30 feet.

An effort is being made to consolidate all of the electric light and gas and water companies in Pottsville, Pa.

It is reported that J. H. Roberts, of Grand Rapids, Mich., will build a $50,000 electric light plant on Mackinac Island.

The preliminary ordinance has been passed enabling Dayton, Ore., to go ahead with the waterworks and electric light construction.

The Mutual Electric Light and Power Company has just completed a fine plant at Brainerd, Ill., at a cost between $75,000 and $100,000.

The franchise for lighting the city of Portsmouth, Ohio, by incandescent lights has been awarded to the Portsmouth Electric Railway Company.

The Citizens' Electric Light and Power Company, of Ashland, Wis., which has just been organized, will have its new plant in operation by January 1.

A number of men in Essex, Conn., are agitating the scheme of organizing a company to light the place by electricity. It is said that water-power can be utilized.

The dynamos for the new incandescent light plant at Grand Island, Neb., have arrived and the plant will soon be in operation. About 1,500 lights have been contracted for.

A petition has been presented to the Circuit Court asking the apointment of a receiver for the Greenfield, Ind., Electric Light and Power Company. The company has been in existence two years. The liabilities and assets are not made public.

A new electric light and power company has been organized in Faribault, Minn. It will utilize the Polar Star mill water-power to run its plant. The company, it is said, will cut the present company's rate over one-half. Power will also be furnished.

The real estate, machinery, rights, patents, privileges and appurtenances of the Thomson-Houston Electric Company, of New York, were sold at auction last week. This company was originally the East River Electric Light Company and was organized by several well-known politicians.

The suit of the Mather Electric Company, of Manchester, Conn., against the Waring Electric Company, in the Superior Court at Hartford, Conn., has been settled by the defendant paying $959. The suit grew out of an alleged infringement of an incandescent lamp. The defendant company is in a receiver's hands.

The committee on gas and electric lights recently recommended that the contract for lighting the city of Omaha, Neb., for three years, from January 1, 1895, be awarded to the Citizens' Electric Light and Power Company, at $109.50 per light per annum. The report was adopted, and the city attorney was directed to prepare the contract. The bid of the Thomson-Houston company was $130.

Any municipality wanting a job lot of electric lighting statistics should apply to the Common Council of Grand Rapids. The statistics are a trifle weak in places, will undoubtedly develop blow holes in service, but in other respects are well built and as good as any statistics which could be procured. The lot comprises figures which prove both sides of the controversy.—*Grand Rapids, Mich., Herald.*

The Conference Committee of Allegheny, Pa., Councils, which was appointed to decide whether the Westinghouse Electric and Manufacturing Company or the Western Electric Company should get the contract for the new electric light plant, met on November 26, and after an hour's discussion adjourned without taking a vote. Some of the councilmen are in favor of giving the contract to the home company, while others think the lowest bidder ought to get it.

The special committee of Councils appointed to report upon the advisability of the city of Reading, Pa., providing its own electric light plant have prepared an exhaustive report covering 25 pages. The committee will urge the city to erect a plant to cost about $150,000. They will also recommend the abolition of incandescent lights for street illumination, and that the present number of arc lights be doubled. The report gives the result of the committee's visit to other cities. The streets of Reading are at present lighted by the Metropolitan Electric Light Company, a corporation in which Philadelphians principally are interested. The annual cost to the city is nearly $50,000.

OBITUARY.

The Dodge Manufacturing Company, of Mishawaka, Ind., has issued, in memoriam of its founder and president, Wallace Harlow Dodge, an interesting sketch of his life. Mr. Dodge was born at Mishawaka on July 10, 1848, and died there on September 10, 1894.

The Prevention of Accidental Electric Shocks.

The ELECTRICAL REVIEW recently published the excellent set of rules for the prevention of electric shocks and for the resuscitation of persons accidentally shocked devised by Mr. W. Langdon, superintendent of the telegraph department of the Midland Railway of England. In answer to an inquiry as to whether Mr. Langdon had had any practical experience in the working of his instructions, the following letter has been received:

TO THE EDITOR OF ELECTRICAL REVIEW:

I am obliged by your courteous letter of the 15th inst. In reply to your inquiry, I am not aware that any occasion has yet arisen under which the instructions in question have been brought into practical service. That portion which refers to the resuscitation of persons suffering from electric shock has been based upon the successful action taken in some instances for reanimation of persons suffering from drowning. I am not aware that the system has ever been applied to persons suffering from electric shock, but it has been stated under medical authority that the action will be the same in either instance, and I am under the impression that correspondence which has occurred under your own pages has also suggested a similar course of procedure. One of the main objects, however, which I had in view in attempting the drafting of such instructions was the prevention of them. If one can induce workmen to proceed with what they have to do in a judicious and careful manner, such terrible accidents need not arise.

Yours faithfully,

W. LANGDON.

Derby, England, November 24.

GENERAL NOTES.

There is a demand, and a big one, too, for an electric heater which will heat a car and consume less energy than is required to run the car.

A project is now on foot to build an electric railroad through the Neversink Valley, in Sullivan County, N. Y., to Grahamsville and from Fallsburgh to Monticello.

The governing committee of the Boston Stock Exchange, according to the Boston *News Bureau*, has refused to permit official dealings in Bell telephone rights, owing to the clause in the company's circular which makes stockholders liable in case of a failure of the assignee to make full payment.

The Coney Island and Brooklyn Trolley Company has made application to the Brooklyn, N. Y., aldermen for permission to extend its tracks through High street, from Jay to Washington. The property owners have made a protest against the granting of the privilege. The company is willing to use the underground system.

The ELECTRICAL REVIEW is in receipt of a number of requests from electric light and power companies for copies of a folder recently issued by it containing directions for the resuscitation of persons shocked by an electric current, and telling how to handle the machinery in such a crisis. If any stations or factories have been overlooked we shall be pleased to forward a copy on application.

This story is told of Anthony N. Brady, a well-known street railway man of Albany, N. Y. Mr. Brady got on a car on one of his roads in Albany. The conductor collected about 40 fares which he did not ring up.

"What did you do?" Mr. Brady was asked. "Did you discharge the conductor?"

"No," he replied promptly, "I sold the road."

The Postal Telegraph-Cable Company inaugurated its new wires to the Pacific Coast on November 30 at midnight after a preliminary test the day before, during which President John W. Mackay held a brief conversation with the officers of the company at San Francisco from his office in New York. The circuit from New York to San Francisco worked perfectly. The new line of the company follows the routes of the Santa Fe and Atlantic and Pacific Railroads.

A Rat Causes a Short Circuit.

A rat short-circuited the big switchboard in the station of the Brush Electric Company at Baltimore last Thursday night. The animal was walking along the bus bars on the back of the board and in stepping from one terminal to another made a short circuit which wrecked the switchboard. The rat was wet, and when it got 2,700 volts it became rigid and stayed so.

The Great Western Manufacturing Company Embarrassed.

The electrical fraternity will not be surprised to learn that the Great Western Manufacturing Company, of Chicago, is embarrassed. The company confessed judgment in the United States Court at Chicago on December 1 for $15,000, and an effort is being made to have a receiver appointed. The company was capitalized at $1,500,000, of which it is said that $700,000 had been paid in. The concern absorbed the Great Western Electrical Supply Company, the Chicago Insulated Wire Company, the Phœnix Manufacturing Company and the Bain Electric Manufacturing Company. A reorganization is contemplated.

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KINDRED INTERESTS

The General Electric Company has received a contract from the West End Street Railway Company, of Boston, for 55 double car equipments. The reported contract price is about $15,000.

Mr. H. C. Adams, of the Phillips Insulated Wire Company, reports that his company has a large number of orders in hand and that prospects for new business are very flattering. The "Ideal" wire is making itself extremely popular.

Negotiations are being made between the Royal Electric Company, of Montreal, Que., and the Stanley Electric Company, of Pittsfield, Mass., for the manufacture in Montreal of electrical devices already patented by the Stanley company, thus saving the latter company the payment of a heavy duty and assuring them a handsome bounty.

A Decree in the settlement of the affairs of the Archer & Pancoast Manufacturing Company, of New York, has been filed in the clerk's office of the United States Circuit Court. The management of the company's affairs has been in the hands of Archer V. Pancoast and Alanson T. Enos, who were appointed receivers on May 19, 1893. The amount of the claims against the company, including interest up to November 17, is $1,081,168.16. The total value of assets in the receivers' hands amounts to $674,398.94. They have a cash balance of $186,620.75. Judge Lacombe declared the receivers' accounts satisfactory and ordered them to be discharged. The assets of the company were sold on November 15 for $600,000 to Samuel B. Lawrence in behalf of the creditors' committee, which was formed under a plan for reorganizing the company.

Southern Railway Company.—On account of the large increase of passenger traffic South *via* the Southern Railway, Piedmont Air Line, an additional limited train has been put on, to leave New York in the afternoon. The first limited departs from New York at 3.20 P. M., and is known as the "New York and Florida Short Line Limited." This train reaches Jacksonville following evening for dinner, making immediate connections through to St. Augustine, reaching there 9.20 P. M.; also connections for Augusta, reaching Augusta at 3.30 P. M. The second limited, leaving New York at 4.30 P. M., is the Great Washington and Southwestern Vestibuled Limited, reaching Atlanta following afternoon at 3.55 and New Orleans second morning 7.25 A. M. and Memphis 7.25 A. M., connecting at Salisbury for Asheville, Chattanooga, Knoxville and Nashville. The Fast Mail leaves as usual, 12.15 A. M., with through sleeping cars to Montgomery and Jacksonville. To those going South a more desirable route cannot be selected. The Southern operates over 5,000 miles of rail south of the Potomac, and reaches all Southern cities and Winter resorts, giving its patrons the best service that can be had.

The Mather Electric Company, of Manchester, Conn., have just closed a contract with the Overman Wheel Company for an electric power transmission plant for their works at Chicopee Falls, Mass., consisting of one 100 kilowatt new type multipolar generator, two 25, one 20 and two 10 horse-power Manchester motors with complete switchboard. The Mather company, who are making a specialty of this class of work, are also installing a similar plant with a 60 kilowatt generator in the mill of the Connecticut River Paper Company, at Holyoke, Mass. The Mather company also booked last week the following orders: Sixty kilowatt new type multipolar generator for the Pierpont Manufacturing Company, New Bedford, Mass., third order; 350 light dynamo for the receivers of the Union Pacific Railroad, Pocatello, Idaho; 350 light dynamo for the Rockwell Manufacturing Company, Milwaukee, Wis.; 350 light dynamo for the Hub Core Makers, Brockton, Mass.; 100 kilowatt railway generator for the Ithaca Street Railway Company, Ithaca, N. Y.; 45 kilowatt direct connected dynamo, with Ideal engine, for the Wayne Hotel, Detroit, Mich.; 350 light dynamo (ring type) for the Meriden Britannia Company, Meriden, Conn.; 250 light dynamo (ring type) for the Berlin Iron Bridge Company, East Berlin, Conn.; 150 light dynamo for Burtis & Howard, Minneapolis, Minn.; 250 light dynamo for C. Dorflinger, White Mills, Pa.; 150 light dynamo for H. B. Coho & Company, New York city; 15 Manchester motors, from three to 15 horse-power.

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